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EXAMINER	
GIESY, ADAM	

ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/511,867	SANO ET AL.	
	Examiner	Art Unit	
	ADAM R. GIESY	2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 January 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2,4,5,7,9-12,14,16-30,32 and 35-52* is/are pending in the application.

4a) Of the above claim(s) *27,37-39 and 44-46* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2,4,5,7,9-12,14,16-26,28-30,32,35,36,40-43 and 47-52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 October 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 2, 4, 5, 7, 9-12, 14, 16-26, 28-30, 32, 35, 36, 40-43, and 47-52 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-13 of U.S. Patent No. 7,330,292 B2 in view of Applicant Admitted Prior Art (AAPA – see current application). The claims of US Pat. No. 7,330,292 B2 do not disclose the exact formula for the step depth or the compositions of the steps, however the AAPA discloses the formulas recited in the current claims. Examiner further asserts that the claimed combination of step heights is obvious (see rejections below).

Drawings

3. Figures 58A-64 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

4. Claims 19 and 36 are objected to because of the following informalities:

Line 1 of claim 19 should be amended to read --...according to claim 14,...-- instead of "...according to claim or 14,...".

Claim 36 is dependent upon claims 35 and canceled claim 34. Examiner asserts that claim 36 should be amended to be dependent upon only claim 35.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claims 40, 41, 43, and 47 are rejected under 35 U.S.C. 102(a) as being anticipated by Applicant Admitted Prior Art (hereinafter AAPA).

Regarding claim 40, AAPA discloses an optical head, comprising: a first light source that emits light of a first wavelength that is in a range of 380 nm to 420 nm and that at least either records onto or reproduces information from a first information recording medium (see Figure 61, element 201); a second light source that emits light of a second wavelength, that at least either records onto or reproduces information from a second information recording medium (202); an optical element that passes light of the first wavelength, and converts the phase of light of the second wavelength (206); focusing means for focusing light of the first wavelength and light of the second wavelength onto the information recording medium (207); and detecting means for detecting light of the first wavelength and light of the second wavelength (201 and 202); wherein the position of the second light source is set closer to the focusing means than a position at which the aberration at the information recording surface of the second information recording medium, when the optical element is not present, is at a minimum (see Figure 61); wherein the optical element is an optical element comprising a substrate, in which steps are formed protruding from a flat surface thereof (see Figure 62A); and wherein the expression: $380 \text{ nm} \leq (n-1) \times d \leq 420 \text{ nm}$ is satisfied when a refractive index of the substrate at a wavelength of 400 nm is n, and a height (nm) of one step is d (see page 3, lines 25-30 and also page 2, lines 10-13 - note that the combination of the two listed expressions will form the expression as recited in the claim).

Regarding claim 41, AAPA discloses an optical head, comprising: a first light source that emits light of a first wavelength that is in a range of 380 nm to 420 nm and that at least either records onto or reproduces information from a first information recording medium (Figure 61, element 201); a second light source that emits light of a second wavelength, that at least either records onto or reproduces information from a second information recording medium (202); an optical element that passes light of the first wavelength, and converts the phase of light of the second wavelength (206); focusing means for focusing light of the first wavelength and light of the second wavelength onto the information recording medium (207); and detecting means for detecting light of the first wavelength and light of the second wavelength (201 and 202); wherein the position of the second light source is set further from the focusing means than a position that is substantially midway between the position of that light source at which the aberration at the information recording surface of the second information recording medium when the optical element is not present is at a minimum, and the position of that light source at which light of the second wavelength that is incident on the focusing means is collimated light (see Figure 61, see also Figure 58A – note that this optical setup includes a collimating lens, element 304, which can be placed as needed); wherein the optical element is an optical element comprising a substrate, in which steps are formed protruding from a flat surface thereof (see Figure 62A); and wherein the expression: $380\ nm \leq (n-1) \times d \leq 420\ nm$ is satisfied when a refractive index of the substrate at a wavelength of 400 nm is n, and a height (nm) of one step is d

(see page 3, lines 25-30 and also page 2, lines 10-13 - note that the combination of the two listed expressions will form the expression as recited in the claim).

Regarding claim 43, AAPA discloses an optical head comprising: a first light source that emits light of a first wavelength that is in a range of 380 nm to 420 nm and that at least either records onto or reproduces information from a first information recording medium (see Figure 61, element 201); a second light source that emits light of a second wavelength, that at least either records onto or reproduces information from a second information recording medium (202); an optical element that passes light of the first wavelength, and converts the phase of light of the second wavelength (206); focusing means for focusing light of the first wavelength and light of the second wavelength onto the information recording medium (207); and detecting means for detecting light of the first wavelength and light of the second wavelength (201 and 202); wherein light of the second wavelength that is incident on the focusing means is collimated light (see Figure 58A – note that this optical setup includes a collimating lens, element 304, which can be placed as needed); wherein the optical element is an optical element comprising a substrate, in which steps are formed protruding from a flat surface thereof (see Figure 62A); and wherein the expression: $380 \text{ nm} \leq (n-1) \times d \leq 420 \text{ nm}$ is satisfied when a refractive index of the substrate at a wavelength of 400 nm is n, and a height (nm) of one step is d (see page 3, lines 25-30 and also page 2, lines 10-13 - note that the combination of the two listed expressions will form the expression as recited in the claim).

Regarding claim 47, AAPA discloses all of the limitations of claim 40 as discussed in the claim 40 rejection above. AAPA further discloses an optical information recording and reproduction apparatus, comprising: an optical head according to claim 39, 40, 41, 43, 45 or 46 (see rejection of claim 40 above); and moving means for moving the information recording media and the optical head relative to each other (see Figure 63, elements 0, 238, and 239).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 2, 4, 5, 7, 9-12, 14, 16-19, 26-30, 32, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (hereinafter AAPA) in view of Ryuichiro (JP Pat. No. 2002-062415).

Regarding claim 2, AAPA discloses an optical element, comprising: a substrate in which grooves are formed (see Figure 62A); wherein the expression: 380 nm ≤ (n- 1) x d ≤ 420 nm is satisfied where n is a refractive index of the substrate at a wavelength of 400 nm, and d (nm) is a depth of one step of the grooves (see page 3, lines 25-30 and also page 2, lines 10-13 - note that the combination of the two listed expressions will form the expression as recited in the claim). Although AAPA discloses that 3 steps can be used, AAPA does not disclose four steps being used to form the grooves.

Ryuichiro discloses a diffractive element containing grooves, wherein the grooves are formed in four steps of depth d, depth 2d, depth 3d and depth 4d (see abstract). Ryuichiro discloses the four steps, but does not disclose the exact order for those steps.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the substrate as disclosed in the AAPA with the four step grooves as disclosed by Ryuichiro, the motivation being to better enable the diffraction of light related to noise in the playback of an optical disc.

Furthermore, a person of ordinary skill in the art would have had good reason to pursue the known options of reducing/diffracting light noise from the reproduction signal of an optical disc system by using a light diffraction element with a groove pattern wherein each pattern contains a stepped groove wherein the step order is given as depth 2d, depth 4d, depth d, depth 3d. It would require no more than "ordinary skill and common sense," to try ordering the steps in this manner instead of ordering the steps from one thru four, in order to create a step difference of at least 2 between any step and a neighboring step to maximize the diffraction efficiency and more efficiently eliminate noise from the system.

Regarding claim 4, AAPA and Ryuichiro disclose all of the limitations of claim 2 as discussed in the claim 2 rejection above. AAPA further discloses that the grooves are formed in concentric ring-shapes (see Figure 62A).

Regarding claim 5, AAPA and Ryuichiro discloses all of the limitations of claim 2 as discussed in the claim 2 rejection above. AAPA further discloses that the grooves

are adjacent via a portion in which no grooves are formed, and the width of each step of the grooves, is substantially the same as the width of the portion in which no grooves are formed (see Figure 60A – note that width '0' is equal to width 'd').

Regarding claim 7, AAPA discloses an optical head, comprising: a first light source that emits light of a first wavelength, that at least either records onto or reproduces information from a first information recording medium (Figure 61, element 201); a second light source that emits light of a second wavelength, that at least either records onto or reproduces information from a second information recording medium (202); focusing means for focusing light that is emitted from the first light source or from the second light source (207); an optical element that passes light of the first wavelength and diffracts light of the second wavelength (206); and photodetecting means for detecting light of the first wavelength and light of the second wavelength (201 and 202); wherein light of the first wavelength and light of the second wavelength pass through the optical element, after which they are focused by the focusing means and are emitted onto the information recording media (see Figure 61); wherein the optical element is an optical element in which grooves are formed in a substrate (see Figure 62S); wherein the expression: $380\ nm \leq (n-1) \times d \leq 420\ nm$ is satisfied where n is a refractive index of the substrate at a wavelength of 400 nm, and d (nm) is a depth of one step of the grooves (see page 3, lines 25-30 and also page 2, lines 10-13 - note that the combination of the two listed expressions will form the expression as recited in the claim); and wherein the photodetecting means detects light that is at least either reflected or diffracted by the information recording media (see page 4, lines 18-20 and

26-28). Although AAPA discloses that 3 steps can be used, AAPA does not disclose four steps being used to form the grooves.

Ryuichiro discloses a diffractive element containing grooves, wherein the grooves are formed in four steps of depth d, depth 2d, depth 3d and depth 4d (see abstract). Ryuichiro discloses the four steps, but does not disclose the exact order for those steps.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the substrate as disclosed in the AAPA with the four step grooves as disclosed by Ryuichiro, the motivation being to better enable the diffraction of light related to noise in the playback of an optical disc.

Furthermore, a person of ordinary skill in the art would have had good reason to pursue the known options of reducing/diffracting light noise from the reproduction signal of an optical disc system by using a light diffraction element with a groove pattern wherein each pattern contains a stepped groove wherein the step order is given as depth 2d, depth 4d, depth d, depth 3d. It would require no more than "ordinary skill and common sense," to try ordering the steps in this manner instead of ordering the steps from one thru four, in order to create a step difference of at least 2 between any step and a neighboring step to maximize the diffraction efficiency and more efficiently eliminate noise from the system.

Regarding claim 9, AAPA and Ryuichiro disclose all of the limitations of claim 7 as discussed in the claim 7 rejection above. AAPA further discloses that the second wavelength is from 1.5 to 1.8 times the length 5 of the first wavelength (see page 4,

lines 12-13 and 20-21 – Examiner notes that 650/405 = 1.6 indicating that the second wavelength is 1.6 times the first wavelength).

Regarding claim 10, AAPA and Ryuichiro disclose all of the limitations of claim 7 as discussed in the claim 7 rejection above. AAPA further discloses that the grooves of the optical element are formed on a face that is close to the focusing means (see Figures 62A and 62B).

Regarding claim 11, AAPA and Ryuichiro disclose all of the limitations of claim 7 as discussed in the claim 7 rejection above. AAPA further discloses that for light of the second wavelength that is diffracted by the optical element, the light that diverges with respect to incident light is stronger than the light that converges with respect to incident light (see page 5, lines 14-29).

Regarding claim 12, AAPA and Ryuichiro disclose all of the limitations of claim 7 as discussed in the claim 7 rejection above. AAPA further discloses that the optical element corrects the aberration to not more than 70 mλ when light of the second wavelength that is diffracted by the optical element is focused on an information surface of a second information recording medium (see page 5, lines 14-29 – Examiner notes that this is inherently disclosed by the cited passage).

Regarding claim 14, AAPA discloses an optical head, comprising: a first light source that emits light of a first wavelength, that at least either records onto or reproduces information from a first information recording medium (Figure 61, element 201); a second light source that emits light of a second wavelength, that at least either records onto or reproduces information from a second information recording medium

(202); a third light source that emits light of a third wavelength, that at least either records onto or reproduces information from a third information recording medium (203); focusing means for focusing light that is emitted from the first light source, from the second light source and from the third light source (207); a first optical element that passes light of the first wavelength and diffracts light of the second wavelength and the third wavelength (206); and photodetecting means for detecting light of the first wavelength, light of the second wavelength and light of the third wavelength (201-203); wherein light of the first wavelength, light of the second wavelength and light of the third wavelength pass through the optical element, after which they are focused by the focusing means and are irradiated onto the information recording media (see Figure 61); wherein the first optical element is an optical element in which grooves are formed in a substrate (see Figure 62A); wherein the expression: 380 nm ≤ (n- 1) x d ≤ 420 nm is satisfied where n is a refractive index of the substrate at a wavelength of 400 nm, and d (nm) is a depth of one step of the grooves (see page 3, lines 25-30 and also page 2, lines 10-13 - note that the combination of the two listed expressions will form the expression as recited in the claim); and wherein the photodetecting means detects light that is at least either reflected or diffracted by the information recording media (see page 4, lines 18-20 and 26-28). Although AAPA discloses that 3 steps can be used, AAPA does not disclose four steps being used to form the grooves.

Ryuichiro discloses a diffractive element containing grooves, wherein the grooves are formed in four steps of depth d, depth 2d, depth 3d and depth 4d (see

abstract). Ryuichiro discloses the four steps, but does not disclose the exact order for those steps.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the substrate as disclosed in the AAPA with the four step grooves as disclosed by Ryuichiro, the motivation being to better enable the diffraction of light related to noise in the playback of an optical disc.

Furthermore, a person of ordinary skill in the art would have had good reason to pursue the known options of reducing/diffracting light noise from the reproduction signal of an optical disc system by using a light diffraction element with a groove pattern wherein each pattern contains a stepped groove wherein the step order is given as depth 2d, depth 4d, depth d, depth 3d. It would require no more than "ordinary skill and common sense," to try ordering the steps in this manner instead of ordering the steps from one thru four, in order to create a step difference of at least 2 between any step and a neighboring step to maximize the diffraction efficiency and more efficiently eliminate noise from the system.

Regarding claim 16, AAPA and Ryuichiro disclose all of the limitations of claim 14 as discussed in the claim 14 rejection above. AAPA further discloses that the second wavelength is from 1.5 to 1.8 times the length of the first wavelength (see page 4, lines 12-13 and 20-21 – Examiner notes that 650/405 = 1.6 indicating that the second wavelength is 1.6 times the first wavelength); and wherein the third wavelength is from 1.8 to 2.2 times the length of the first wavelength (see page 4, lines 12-13 and 28-29 –

Examiner notes that 780/405 = 1.9 indicating that the third wavelength is 1.9 times the first wavelength).

Regarding claim 17, AAPA and Ryuichiro disclose all of the limitations of claim 14 as discussed in the claim 14 rejection above. AAPA further discloses that when a first region is a substantially circle-shaped region in the central vicinity of the first optical element, a second region is a substantially ring-shaped region that surrounds the first region, and a third region is a region on the outside of the second region (see Figures 62A and 62B), light of the first wavelength passes through the first, second and third region, light of the second wavelength passes through the first and second region, and light of the third wavelength passes through the first region (Examiner asserts that this is inherently disclosed – since all the light, which is aimed at the center of the phase element, passes through all parts of the phase element either in a diffracted form or completely passes through unaltered).

Regarding claim 18, AAPA and Ryuichiro disclose all of the limitations of claim 14 as discussed in the claim 14 rejection above. AAPA further discloses that for light of the second wavelength and third wavelength that are diffracted by the first optical element, the light that diverges is stronger than the light that converges with respect to incident light (see page 5, lines 14-29).

Regarding claim 19, AAPA and Ryuichiro disclose all of the limitations of claim 14 as discussed in the claim 14 rejection above. AAPA further discloses that phase correcting means for correcting the aberration of light of the second wavelength that is diffracted by the first optical element to not more than 70 mλ when light of the second

wavelength is focused on the information surface of the second information recording medium (see page 5, lines 14-29), and for correcting the aberration of light of the third wavelength that is diffracted by the first optical element to not more than 70 mλ when light of the third wavelength is focused on the information surface of the 25 third information recording medium (inherently disclosed by see page 5, lines 14-29); wherein the phase correcting means does not change the phase of light of the first wavelength (page 5, lines 19-21); and wherein the phase correcting means is provided in the light path between the light sources and the optical information recording medium (see Figure 61, elements 201, 206, and 208-210).

Regarding claim 26, AAPA and Ryuichiro disclose all of the limitations of claim 14 as discussed in the claim 14 rejection above. AAPA further discloses that when a distance between the surface of the first information recording medium on the focusing means side, and the tip of the focusing means on the side of the first information recording medium is WD1 when light of the first wavelength is irradiated onto the first information recording medium (see Figure 61), and a distance between the surface of the second information recording medium on the focusing means side, and the tip of the focusing means on the side of the second information recording medium is WD2 when light of the second wavelength is irradiated onto the second information recording medium (see Figure 61), and a distance between the surface of the third information recording medium on the focusing means side, and the tip of the focusing means on the side of the third information recording medium is WD3 when light of the third wavelength is irradiated onto the third information recording medium (see Figure 61), a difference

between the maximum value and the minimum value of WD1, WD2 and WD3 is smaller than the maximum value of the diameter of the focusing means (this is inherent in order to have the spots focus properly on the medium at the correct fly height for the objective lens).

Regarding claim 28, AAPA and Ryuichiro disclose all of the limitations of claim 14 as discussed in the claim 14 rejection above. AAPA further discloses a converter for converting a plurality of signals, which are received in parallel, and are output from the photodetecting means into a serial signal (examiner notes that these elements are inherently disclosed as they are necessary for data reproduction – since the apparatus of Figure 61 is a reproduction apparatus for optical media, then examiner asserts that the parallel converts are inherently disclosed in elements 201-203 and should be able to function with the three beam method [noted in the instant specification as DPP] as shown in Figure 64).

Regarding claim 29, AAPA and Ryuichiro disclose all of the limitations of claim 14 as discussed in the claim 14 rejection above. AAPA further discloses a converter for converting a plurality of signals, which are received in parallel, and are output from the photodetecting means, into a serial signal (examiner notes that these elements are inherently disclosed as they are necessary for data reproduction – since the apparatus of Figure 61 is a reproduction apparatus for optical media, then examiner asserts that the parallel converts are inherently disclosed in elements 201-203 and should be able to function with the three beam method [noted in the instant specification as DPP] as shown in Figure 64); wherein the serial signal is an electrical signal (inherently

suggested by reference, since the entire function of a photodetector is to convert a light signal into an electrical signal – thus the converters take the electrical signal from the photodetectors and convert it into a read signal which is still an electrical signal).

Regarding claim 30, AAPA and Ryuichiro disclose all of the limitations of claim 14 as discussed in the claim 14 rejection above. AAPA further discloses a first converter for converting a plurality of signals, which are output from the photodetecting means and received in parallel, into a serial signal (examiner notes that these elements are inherently disclosed as they are necessary for data reproduction – since the apparatus of Figure 61 is a reproduction apparatus for optical media, then examiner asserts that the parallel converts are inherently disclosed in elements 201-203 and should be able to function with the three beam method [noted in the instant specification as DPP] as shown in Figure 64); and second converter means for receiving the electric signal that is output from the first converter means and for converting the electric signal into an optical signal (inherently suggested by reference, since the entire function of a photodetector is to convert a light signal into an electrical signal – thus the converters take the electrical signal from the photodetectors and convert it into a read signal which is still an electrical signal).

Regarding claim 32, AAPA discloses an optical information recording and reproduction apparatus, comprising: an optical head that includes (see Figure 61); a first light source that emits light of a first wavelength, that at least either records onto or reproduces information from a first information recording medium (201); a second light source that emits light of a second wavelength, that at least either records onto or

reproduces information from a second information recording medium (202); focusing means for focusing light that is emitted from the first light source or from the second light source (207); an optical element that passes light of the first wavelength and diffracts light of the second wavelength (206); and photodetecting means for detecting light of the first wavelength and light of the second wavelength (201-203), further comprising: moving means for moving the information recording medium and the optical head relative to each other (see Figure 63, elements 238 and 239); wherein light of the first wavelength and light of the second wavelength pass through the optical element, after which they are focused by the focusing means and are irradiated onto the information recording media (see Figure 61); wherein the optical element is an optical element in which grooves are formed in a substrate (see Figure 62A); wherein the expression: 380 nm ≤ (n- 1) x d ≤ 420 nm is satisfied where n is a refractive index of the substrate at a wavelength of 400 nm, and d (nm) is a depth of one step of the grooves (see page 3, lines 25-30 and also page 2, lines 10-13 - note that the combination of the two listed expressions will form the expression as recited in the claim); and wherein the photodetecting means detects light that is at least either reflected or diffracted by the information recording media (see page 4, lines 18-20 and 26-28). Although AAPA discloses that 3 steps can be used, AAPA does not disclose four steps being used to form the grooves.

Ryuichiro discloses a diffractive element containing grooves, wherein the grooves are formed in four steps of depth d, depth 2d, depth 3d and depth 4d (see

abstract). Ryuichiro discloses the four steps, but does not disclose the exact order for those steps.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the substrate as disclosed in the AAPA with the four step grooves as disclosed by Ryuichiro, the motivation being to better enable the diffraction of light related to noise in the playback of an optical disc.

Furthermore, a person of ordinary skill in the art would have had good reason to pursue the known options of reducing/diffracting light noise from the reproduction signal of an optical disc system by using a light diffraction element with a groove pattern wherein each pattern contains a stepped groove wherein the step order is given as depth 2d, depth 4d, depth d, depth 3d. It would require no more than "ordinary skill and common sense," to try ordering the steps in this manner instead of ordering the steps from one thru four, in order to create a step difference of at least 2 between any step and a neighboring step to maximize the diffraction efficiency and more efficiently eliminate noise from the system.

Regarding claim 35, AAPA discloses an optical information recording and reproduction apparatus, comprising: an optical head that includes (see Figure 61); a first light source that emits light of a first wavelength, that at least either records onto or reproduces information from a first information recording medium (201); a second light source that emits light of a second wavelength, that at least either records onto or reproduces information from a second information recording medium (202); a third light source that emits light of a third wavelength, that at least either records onto or

reproduces information from a third information recording medium (203); focusing means for focusing light that is emitted from the first light source, from the second light source and from the third light source (207); a first optical element that passes light of the first wavelength and diffracts light of the second wavelength and light of the third wavelength (206); and photodetecting means for detecting light of the first wavelength, light of the second wavelength, and light of the third wavelength (201-203); further comprising: moving means for moving the information recording medium and the optical head relative to each other (see Figure 63, elements 238 and 239); wherein light of the first wavelength, light of the second wavelength and light of the third wavelength pass through the optical element, after which they are focused by the focusing means and are irradiated onto the information recording media (see Figure 61); wherein the first optical element is an optical element in which grooves are formed in a substrate (see Figure 62A); wherein the expression: 380 nm ≤ (n- 1) x d ≤ 420 nm is satisfied, where n is a refractive index of the substrate at a wavelength of 400 nm, and d (nm) is a depth per step of the grooves (see page 3, lines 25-30 and also page 2, lines 10-13 - note that the combination of the two listed expressions will form the expression as recited in the claim); and wherein the photodetecting means detects light that is at least either reflected or diffracted by the information recording media (see page 4, lines 18-20 and 26-28). Although AAPA discloses that 3 steps can be used, AAPA does not disclose four steps being used to form the grooves.

Ryuichiro discloses a diffractive element containing grooves, wherein the grooves are formed in four steps of depth d, depth 2d, depth 3d and depth 4d (see

abstract). Ryuichiro discloses the four steps, but does not disclose the exact order for those steps.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the substrate as disclosed in the AAPA with the four step grooves as disclosed by Ryuichiro, the motivation being to better enable the diffraction of light related to noise in the playback of an optical disc.

9. Claims 20-25 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (hereinafter AAPA) in view of Ryuichiro (JP Pat. No. 2002-062415) and further in view of Hamada et al. (hereinafter Hamada – US Pat. No. 5,475,670).

Regarding claim 20, AAPA and Ryuichiro disclose all of the limitations of claim 14 as discussed in the claim 14 rejection above. AAPA further discloses that wherein light of the first wavelength, light of the second wavelength and light of the third wavelength pass through the two optical elements, after which they are focused by the focusing means, and irradiated onto the optical information recording medium (see Figure 61). AAPA fails to directly disclose a second optical element.

Hamada discloses an optical recording apparatus wherein an optical diffraction/deflection plate can be two sided (see column 2, lines 27-36 – Examiner notes that a two sided diffraction plate is similar to the disclosed invention which merely has a single plate with patterns on both sides of the plate comprising first and second optical elements).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the diffraction plate and optical apparatus as disclosed by AAPA and a diffraction plate with patterns on both sides as disclosed by Hamada, the motivation to be able to diffract different wavelengths of light in different ways using the same optical element.

Regarding claim 21, AAPA and Ryuichiro disclose all of the limitations of claim 14 as discussed in the claim 14 rejection above. AAPA further discloses that wherein light of the first wavelength, light of the second wavelength and light of the third wavelength pass through the two optical elements, after which they are focused by the focusing means, and irradiated onto the optical information recording medium (see Figure 61); wherein the optical element is an optical element in which grooves are formed in a substrate (see Figure 62A); wherein the expression: 760 nm $\leq$ (n- 1) x d $\leq$ 840 nm is satisfied where n is a refractive index of the substrate at a wavelength of 400 nm, and d (nm) is a depth per step of the grooves (see page 3, lines 25-30 and page 2, lines 2-4 – note that the combination of the two listed expressions will form the expression as recited in the claim); and wherein the grooves are formed in two steps of depth d and depth 2d (see Figure 59). AAPA fails to directly disclose a second optical element.

Hamada discloses an optical recording apparatus wherein an optical diffraction/deflection plate can be two sided (see column 2, lines 27-36 – Examiner notes that a two sided diffraction plate is similar to the disclosed invention which merely

has a single plate with patterns on both sides of the plate comprising first and second optical elements).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the diffraction plate and optical apparatus as disclosed by AAPA and a diffraction plate with patterns on both sides as disclosed by Hamada, the motivation to be able to diffract different wavelengths of light in different ways using the same optical element.

Regarding claim 22, AAPA and Ryuichiro disclose all of the limitations of claim 14 as discussed in the claim 14 rejection above. AAPA further discloses that wherein light of the first wavelength, light of the second wavelength and light of the third wavelength pass through the two optical elements, after which they are focused by the focusing means, and irradiated onto the optical information recording medium (see Figure 61); wherein the optical element is an optical element in which grooves are formed in a substrate (see Figure 62A); wherein the expression: 760 nm ≤ (n- 1) x d ≤ 840 nm is satisfied where n is a refractive index of the substrate at a wavelength of 400 nm, and d (nm) is a depth per step of the grooves (see page 3, lines 25-30 and page 2, lines 2-4 – note that the combination of the two listed expressions will form the expression as recited in the claim); and wherein the grooves are formed in three steps of depth d, depth 2d, and depth 3d (see Figure 59). AAPA fails to directly disclose a second optical element.

Hamada discloses an optical recording apparatus wherein an optical diffraction/deflection plate can be two sided (see column 2, lines 27-36 – Examiner

notes that a two sided diffraction plate is similar to the disclosed invention which merely has a single plate with patterns on both sides of the plate comprising first and second optical elements).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the diffraction plate and optical apparatus as disclosed by AAPA and a diffraction plate with patterns on both sides as disclosed by Hamada, the motivation to be able to diffract different wavelengths of light in different ways using the same optical element.

Regarding claim 23, AAPA and Ryuichiro disclose all of the limitations of claim 14 as discussed in the claim 14 rejection above. AAPA further discloses that wherein light of the first wavelength, light of the second wavelength and light of the third wavelength pass through the two optical elements, after which they are focused by the focusing means, and irradiated onto the optical information recording medium (see Figure 61). AAPA fails to directly disclose a second optical element.

Hamada discloses an optical recording apparatus wherein an optical diffraction/deflection plate can be two sided (see column 2, lines 27-36 – Examiner notes that a two sided diffraction plate is similar to the disclosed invention which merely has a single plate with patterns on both sides of the plate comprising first and second optical elements).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the diffraction plate and optical apparatus as disclosed by AAPA and a diffraction plate with patterns on both sides as disclosed by Hamada,

the motivation to be able to diffract different wavelengths of light in different ways using the same optical element.

Regarding claim 24, AAPA and Ryuichiro disclose all of the limitations of claim 14 as discussed in the claim 14 rejection above. AAPA further discloses that wherein light of the first wavelength, light of the second wavelength and light of the third wavelength pass through the two optical elements, after which they are focused by the focusing means, and irradiated onto the optical information recording medium (see Figure 61). AAPA fails to directly disclose a second optical element.

Hamada discloses an optical recording apparatus wherein an optical diffraction/deflection plate can be two sided (see column 2, lines 27-36 – Examiner notes that a two sided diffraction plate is similar to the disclosed invention which merely has a single plate with patterns on both sides of the plate comprising first and second optical elements).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the diffraction plate and optical apparatus as disclosed by AAPA and a diffraction plate with patterns on both sides as disclosed by Hamada, the motivation to be able to diffract different wavelengths of light in different ways using the same optical element.

Regarding claim 25, AAPA and Ryuichiro disclose all of the limitations of claim 14 as discussed in the claim 14 rejection above. AAPA further discloses that wherein light of the first wavelength, light of the second wavelength and light of the third wavelength pass through the two optical elements, after which they are focused by the

focusing means, and irradiated onto the optical information recording medium (see Figure 61); and wherein the first and second optical elements correct the aberration of light of the second wavelength that is diffracted by the first and second optical elements to not more than 70 mλ when that light is focused onto the information surface of the second information recording medium (see page 5, lines 14-29); and correct the aberration of light of the wavelength λ 3 that is diffracted by the first optical element to not more than 70 mλ when that light is focused on the information surface of the third information recording medium (inherently disclosed by page 5, lines 14-29). AAPA fails to directly disclose a second optical element.

Hamada discloses an optical recording apparatus wherein an optical diffraction/deflection plate can be two sided (see column 2, lines 27-36 – Examiner notes that a two sided diffraction plate is similar to the disclosed invention which merely has a single plate with patterns on both sides of the plate comprising first and second optical elements).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the diffraction plate and optical apparatus as disclosed by AAPA and a diffraction plate with patterns on both sides as disclosed by Hamada, the motivation to be able to diffract different wavelengths of light in different ways using the same optical element.

Regarding claim 36, AAPA and Ryuichiro disclose all of the limitations of claim 35 as discussed in the claim 35 rejection above. AAPA further discloses that wherein light of the first wavelength, light of the second wavelength and light of the third

wavelength pass through the two optical elements, after which they are focused by the focusing means, and irradiated onto the optical information recording medium (see Figure 61). AAPA fails to directly disclose a second optical element.

Hamada discloses an optical recording apparatus wherein an optical diffraction/deflection plate can be two sided (see column 2, lines 27-36 – Examiner notes that a two sided diffraction plate is similar to the disclosed invention which merely has a single plate with patterns on both sides of the plate comprising first and second optical elements).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the diffraction plate and optical apparatus as disclosed by AAPA and a diffraction plate with patterns on both sides as disclosed by Hamada, the motivation to be able to diffract different wavelengths of light in different ways using the same optical element.

10. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (hereinafter AAPA) in view of Fujita (US Pat. No. 5,886,964).

Regarding claim 42, AAPA discloses all of the limitations of claim 40 as discussed in the claim 40 rejection above. AAPA does not disclose

Fujita discloses an optical head including tilting means for tilting the focusing means (see Figure 1, element 15).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the optical apparatus as disclosed by AAPA with the tilt

correction element in the optical head as disclosed by Fujita, the motivation being to be able to correct for the inevitable aberration that occurs with individual optical heads.

11. Claims 48-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (hereinafter AAPA) in view of Awazu et al. (hereinafter Awazu – US Pat. No. 6,292,443 B1).

Regarding claim 48, AAPA discloses all of the limitations of claim 40 as discussed in the claim 40 rejection above. AAPA does not disclose a computer using the optical information recording and reproduction apparatus as an external storage device.

Awazu discloses an optical storage device with a computer (see column 1, lines 14-21).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the optical device as disclosed by AAPA with the uses for an optical drive as disclosed by Awazu, the motivation being to create a single drive that can easily be transported and used with multiple computers.

Furthermore, it has been held that making an old device portable or movable without producing any new and unexpected result involves only routine skill in the art. *In re Lindberg*, 93 USPQ 23 (CCPA 1952).

Regarding claim 49, AAPA discloses all of the limitations of claim 40 as discussed in the claim 40 rejection above. AAPA does not disclose an image recording device which can at least record images from among recording images onto and reproducing images from an information recording medium.

Awazu discloses an optical storage device which can make/read photo CDs (see column 1, lines 14-21).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the optical device as disclosed by AAPA with the uses for an optical drive as disclosed by Awazu, the motivation being to allow the optical device to be used as a multifunctional tool.

Regarding claim 50, AAPA discloses all of the limitations of claim 40 as discussed in the claim 40 rejection above. AAPA does not disclose an image reproduction device that specializes in reproducing images from an information recording medium.

Awazu discloses an optical storage device which can make/read photo CDs (see column 1, lines 14-21).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the optical device as disclosed by AAPA with the uses for an optical drive as disclosed by Awazu, the motivation being to allow the optical device to be used as a multifunctional tool.

Regarding claim 51, AAPA discloses all of the limitations of claim 40 as discussed in the claim 40 rejection above. AAPA does not disclose a server using the optical information recording and reproduction apparatus as an external storage device.

Awazu discloses an optical storage device with a computer (see column 1, lines 14-21).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the optical device as disclosed by AAPA with the uses for an optical drive as disclosed by Awazu, the motivation being to create a single drive that can easily be transported and used with multiple computers.

Furthermore, it has been held that making an old device portable or movable without producing any new and unexpected result involves only routine skill in the art. *In re Lindberg*, 93 USPQ 23 (CCPA 1952).

Regarding claim 52, AAPA discloses all of the limitations of claim 40 as discussed in the claim 40 rejection above. AAPA does not disclose a car navigation system using the optical information recording and reproduction apparatus as an external storage device.

Awazu discloses an optical storage device with a car navigation CDs (see column 1, lines 14-21).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the optical device as disclosed by AAPA with the uses for an optical drive as disclosed by Awazu, the motivation being to create a single drive that can easily be transported and used with multiple computers.

Furthermore, it has been held that making an old device portable or movable without producing any new and unexpected result involves only routine skill in the art. *In re Lindberg*, 93 USPQ 23 (CCPA 1952).

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ADAM R. GIESY whose telephone number is (571)272-7555. The examiner can normally be reached on 8:00am- 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne R. Young can be reached on (571) 272-7582. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ARG 3/24/2008

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